Amendments to the Claims

1. (Currently Amended) A method for lossless coding of image and video media, comprising:

splitting input image data into block portions;

for an individual one of the block portions, selecting one of multiple available differential pulse code modulation (DPCM) prediction modes to apply to the block portion that out of the available DPCM prediction modes yields a closer to optimal two-sided, zero-biased symbol distribution of a run-length, Golomb-Rice entropy encoder;

applying the selected DPCM prediction mode to the block portion; ~~and~~

entropy encoding DPCM residuals of the block portion using run-length Golomb-Rice encoding; and

outputting the encoded DPCM residuals of the block portion in a bitstream.

2. (Original) The method of claim 1 further comprising:

converting the input image data into a YCoCg color space format.

3-4. (Canceled)

5. (Original) The method of claim 1 further comprising encoding the DPCM prediction mode and DPCM residuals with separate run-length, Golomb-Rice coding contexts.

6. (Currently Amended) The method of claim 1 further comprising:

determining whether application of the selected DPCM prediction mode to the block portion produces all zero valued DPCM residuals; and

if so, encoding ~~an indication that the block portion is flat instead of~~ the block portion without entropy encoding DPCM residuals of the block portion.

7. (Original) The method of claim 1 wherein the selecting the DPCM prediction mode comprises:

determining whether the DPCM prediction mode yielding the closer to optimal symbol distribution for entropy coding is sufficiently close to the optimal symbol distribution for entropy coding; and

if not sufficiently close, applying no DPCM to the macro-block before the entropy encoding.

8. (Original) The method of claim 1 wherein the DPCM prediction modes comprise modes designed to produce an optimal distribution for entropy coding for block portions whose image content is predominantly a horizontal major edge, a vertical major edge, ramp diagonal edges, bands, and banded horizontal ramps.

9. (Original) The method of claim 1 wherein the DPCM prediction modes comprise:

a first mode in which a pixel's value is subtracted from its left neighboring pixel;

a second mode in which a pixel's value is subtracted from its top neighboring pixel;

a third mode in which a pixel's value is subtracted from a minimum or maximum of its left and top neighboring pixels;

a fourth mode in which a pixel's value is subtracted from an average of its top and top right neighboring pixels;

a fifth mode in which a pixel's value is subtracted from its top-left neighboring pixel;

a sixth mode in which the difference between a pixel's top and top-left neighboring pixels is subtracted from its left neighboring pixel; and

a seventh mode in which a pixel's value is subtracted from an average of the pixel's left and top neighboring pixels.

10. (Currently Amended) A computer-implemented media system providing predictive lossless coding of image or video media content, the system comprising a computer comprising one or more computer-readable storage media and a processor, the computer-readable storage media containing instructions, which, when executed by the processor on the computer, cause the computer to perform the actions of:

a macro-block division process for separating input image data into macro-blocks;

a multi-mode differential pulse code modulation (DPCM) process operating on an individual macro-block of the input image data to choose one of multiple DPCM prediction modes that produces a residual distribution for the macro-block to more closely match an optimal two-sided, zero-biased, run-length, Golomb-Rice (RLGR) entropy coding distribution, and applies the chosen DPCM prediction mode to the macro-block; and

an entropy coding process for performing a run-length, Golomb-Rice coding of the DPCM residuals of the macro-block.

11. (Previously Presented) The computer-implemented media system of claim 10 further comprising a color space conversion process for converting the input image data prior to a YCoCg color space format prior to coding.

12. (Currently Amended) The computer-implemented media system of claim 10 wherein the DPCM prediction modes comprise modes designed to produce distributions close to the optimal two-sided, zero-biased RLGR entropy coding distribution for macro-blocks whose image content is predominantly a horizontal major edge, a vertical major edge, ramp diagonal edges, bands, and banded horizontal ramps.

13. (Previously Presented) The computer-implemented media system of claim 10 wherein the DPCM prediction modes comprise:

a first mode in which a pixel's value is subtracted from its left neighboring pixel;

a second mode in which a pixel's value is subtracted from its top neighboring pixel;

a third mode in which a pixel's value is subtracted from a minimum or maximum of its left and top neighboring pixels;

a fourth mode in which a pixel's value is subtracted from an average of its top and top right neighboring pixels;

a fifth mode in which a pixel's value is subtracted from its top-left neighboring pixel;

a sixth mode in which the difference between a pixel's top and top-left neighboring pixels is subtracted from its left neighboring pixel; and

a seventh mode in which a pixel's value is subtracted from an average of the pixel's left and top neighboring pixels.

14. (Currently Amended) A computer-readable storage medium having computer-executable program instructions stored thereon, operative upon execution in a computer media processing system to perform a method of encoding image or video data, the method comprising:

converting image data to a YCoCg color space format;

splitting the image data into macro-blocks;

for a macro-block of the image data, determining which from a group of available DPCM prediction modes produces residuals closest to an optimal two-sided, zero-biased distribution for RLGR coding;

if such determined DPCM prediction mode produces residuals whose distribution is sufficiently close to the two-sided, zero-biased optimal distribution, applying the DPCM prediction mode to the macro-block; and

RLGR entropy encoding the residuals of the macro-block.

15. (Currently Amended) The computer-readable storage medium of claim 14 wherein the method further comprises:

determining whether application of the determined DPCM prediction mode to the macro-block produces flat residuals; and

if so, encoding the macro-block ~~as a flat macro-block mode indication~~ without the RLGR entropy encoding the residuals of such flat macro-block.

16. (Original) The computer-readable storage medium of claim 15 wherein the method further comprises:

RLGR entropy encoding the macro-block mode indication using a separate RLGR coding context than for RLGR entropy encoding the residuals.

17. (Currently Amended) The computer-readable storage medium of claim 15 wherein the method further comprises:

determining whether the DPCM prediction mode producing a residual distribution closest to the optimal two-sided, zero-biased distribution produces a residual distribution sufficiently close to the optimal two-sided, zero-biased distribution; and

if not sufficiently close, RLGR entropy encoding the macro-block without applying the DPCM prediction mode to the macro-block.

18. (Currently Amended) A method of decoding predictive losslessly coded data of an image or video, comprising:

RLGR entropy decoding a macro-block mode, a DPCM prediction mode and DPCM residuals for each of a plurality of macro-blocks using separate RLGR coding contexts;

where the macro-block mode of a macro-block is a flat macro-block mode, decoding the macro-block's pixels using a DPCM demodulation that is an inverse of the RLGR-decoded DPCM prediction mode of all zero residuals;

otherwise, where the DPCM prediction mode of the macro-block is a no DPCM prediction mode because application of possible DPCM prediction modes did not yield a symbol distribution for RLGR entropy encoding sufficiently close to an optimal symbol distribution for RLGR entropy encoding such that the symbol distribution meets a sufficiency threshold, decoding the macro-block's pixels without DPCM demodulation;

otherwise, de-modulating the RLGR-decoded DPCM residuals using a DPCM demodulation that is an inverse of the RLGR-decoded DPCM prediction mode; and

assembling the macro-blocks to form a decoded image data.

19. (Original) The method of claim 18 comprising:

converting the decoded image data from a YCoCg color space format to a displayable color space format.

20. (Currently Amended) A predictive-lossless coded image or video decoder, comprising:

a run-length Golomb-Rice (RLGR) entropy decoder operating to decode RLGR-encoded DPCM residuals and DPCM prediction mode of a macro-block;

a DPCM demodulator for applying an inverse of the DPCM prediction mode to the DPCM residuals if the macro-block was encoded using a DPCM prediction mode;

otherwise, where the macro-block was not encoded using a DPCM prediction mode because application of possible DPCM prediction modes did not yield a symbol distribution for RLGR entropy encoding sufficiently close to an optimal symbol distribution for RLGR entropy encoding such that the symbol distribution meets a sufficiency threshold, decoding the macro-block without DPCM demodulation; and

a macro-block reassembler for assembling the macro-block with other decoded macro-blocks to form data of a reconstructed image.

21. (Original) The predictive-lossless coded image or video decoder of claim 20, comprising:

an inverse YCoCg converter for converting the reconstructed image from a YCoCg color space to a color space suited for displaying the image.